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Variations in the Summer Monsoon Rainbands across eastern China over the past 300 years

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Based on reconstructions of precipitation events from the rain and snowfall archives of the Qing Dynasty (1736-1911), the drought/flood index data mainly derived from Chinese local gazettes from 1736-2000, and the observational data gathered since 1951, the spatial patterns of monsoon rainbands is analyzed at different time scales. Findings indicate that monsoon rains in northern China and the middle-lower reaches of the Yangtze River have significant inter-annual (e.g. quasi-5yr, and 2-4yr) as well as inter-decadal (e.g. 20-30yr and quasi-10yr) fluctuation signals. The spatial patterns in these areas also show significant cycles: On a 60-80yr time scale, a reversal phase predominates the entire period from 1736-2000; on a 30-40yr time scale, a consistent phase was prevalent from 1736 to 2000; and on a 20yr time scale, the summer monsoon rains show different spatial patterns before and after 1870. These significant cycles likely result from various atmospheric circulation modes, such as the Pacific Decadal Oscillation (PDO), Antarctic Oscillation (AO), El Nino Southern Oscillation (ENSO), and Atlantic Multi-decadal Oscillation (AMO).